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NOTES ON SURGERY
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BLACK-BOARD HEADINGS

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LECTURES ON SURGERY

BY

ROBERT F. WEIR, M. D.,

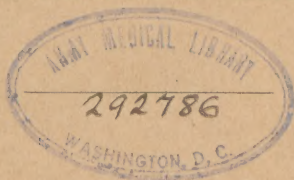
PROFESSOR OF SURGERY IN THE COLLEGE OF PHYSICIANS AND SURGEONS
OF COLUMBIA UNIVERSITY.

EDITED BY

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AND

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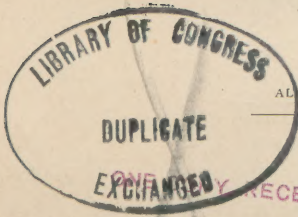
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TO THEIR
FELLOW-STUDENTS
AT THE
COLLEGE OF PHYSICIANS AND SURGEONS
OF
COLUMBIA UNIVERSITY
THESE NOTES ARE DEDICATED
BY
THE EDITORS.

0905

PREFACE.

The object of these notes is to save the student the time and trouble of copying the black-board tables given during the lectures, and thus to enable him to pay closer attention, to take better notes and to do more systematic reading.

The notes are not intended to be a summary of facts and principles, but rather a series of headings, indicating the order of the topics discussed and the mode in which they are treated by the lecturer. They are therefore not offered as a substitute for notes upon the lectures themselves, but as a guide for the student in his work.

As few changes as possible have been introduced by the editors, as they believe the original form of these tables to be of more value than anything bearing their own emendations and additions.

Exceptions, however, have been made, with Dr. Weir's approval, in a few cases where a topic which has been spoken of in the lectures, receives no place in the black-board tables.

To secure unity of the work, the editors have adopted a system of subdivisions which does not obtain on the black-boards. This has been done without altering the order of the topics.

In conclusion, we take the opportunity of thanking Professor Weir for the interest which he has taken in our work, and for the courtesies which he has shown us while we were preparing this pamphlet.

NEW YORK, October, 1898.

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PART I—GENERAL SURGERY:

EDITED BY

GEORGE ALEXANDER SAXE, M.D.

SECTION I—INTRODUCTORY LECTURES.

I.—HEMORRHAGE.

A.—Arrested by Nature:

1. Contraction of arteries and capillaries,
2. Mechanical entanglement of blood in tissues,
3. Coagulation of blood,
4. Decrease in blood pressure,
5. Laceration of inner coats in larger vessels.

B.—Arrested artificially by:

- | | |
|-------------------------|-------------------------|
| 1. Mechanical pressure, | (a) Pads, |
| | (b) Bandages, |
| 2. Position, | (c) Tourniquets, |
| 3. Flexion, | (d) Clamps, |
| 4. Heat (cautery), | (e) Hæmostatic forceps, |
| 5. Cold, | (f) Torsion, |
| 6. Styptics, | (g) Acupressure. |
| 7. Ligature (a) Catgut, | |
| (b) Silk. | |

C.—Arrest retarded by:

1. Hæmophilia,
2. A partial division of artery.
A division of an artery or vein in muscle. Heart
stimulants. Excitement. Movements of part.

II.—WOUNDS.

A.—Incised wounds are closed by :

1. Plaster. Use gauze to protect wound.

- | | | | | |
|------------|---|------------------|---|----------------------|
| 2. Sutures | { | (a) Continuous | { | (a) Catgut, |
| | | or | | (b) Silk, |
| | | (b) Interrupted, | | (c) Silkworm gut, |
| | | | | (d) Silver wire, |
| | | | | (a) Catgut, |
| | | | | (b) Kangaroo tendon, |
| | | (c) Buried, | | (c) Silkworm gut, |
| | | | | (d) Silk, |
| | | | | (e) Silver wire. |
-
- | | | |
|----------------|---|----------------------------|
| Surgical knots | { | (a) Reef or flat knot, |
| | | (b) Granny's knot (N. G.), |
| | | (c) Surgeon's knot, |
| | | (d) Staffordshire knot. |
-
- | | | |
|------------------|---|------------------|
| Surgical needles | { | (a) Full curved, |
| | | (b) Half curved, |
| | | (c) Straight. |

B.—Healing of wounds:

1. Immediate union (?),
2. Primary union,
3. Secondary union,
4. Granulation.

III.—INFLAMMATION.

A.—Simple inflammation :

1. Disturbed nutrition,
2. Aseptic,
3. Without suppuration,
4. Includes :
 - (a) Vascular changes :
 - I. Diapedesis,
 - II. Emigration of Leucocytes.
 - (b) Cell changes :
 - I. Multiplication,
 - II. Chemotaxis,
 - III. Phagocytosis.
 - (c) Toxæmia.

5. *Signs*, five in number :
 - (a) Heat (*calor*),
 - (b) Redness (*rubor*),
 - (c) Swelling (*tumor*),
 - (d) Pain (*dolor*),
 - (e) Impaired function (*functio læsa*).
6. Associated with :
 - (a) Cell necrosis,
 - (b) Cell changes,
 - (c) Cell repair,
 - (d) Cell heredity,
 - (e) Cell degeneration.

B.—Infectious inflammation :

1. Of germ origin,
2. Septic,
3. Produces suppuration,
4. Common pyogenic germs :
 - (a) *Staphylococcus pyogenes aureus*,
 - (b) " " *citreus*,
 - (c) " " *albus*,
 - (d) *Streptococcus* "
 - (e) " " *erysipelatis*,
 - (f) *Bacillus coli communis*,
 - (g) " *pyocyaneus*.
5. Rarer pyogenic germs :
 - (a) *Bacillus typhosus*,
 - (b) " *proteus*,
 - (c) " *diphtheriæ*,
 - (d) " *mallei* (glanders),
 - (e) " *pneumoniæ* (diplococcus),
 - (f) " of bubonic plague,
 - (g) *Gonococcus*.
6. Germs act in various ways :
 - (a) Mechanically,
 - (b) By starving cells,
 - (c) By local poisoning,
 - (d) By systemic poisoning, {
 1. *ptomaines*,
 2. *leucomaines*,
 3. *Toxins*.

7. Virulence of germs depends upon :

- (a) Quantity introduced,
- (b) Vitality of germs,
- (c) Associated germs (mixed infection), or ptomaines.
- (d) Locality of infection,
- (e) Predisposition of patient or resisting power of body.

8. *Park* in 125 cases of suppuration found :

Staphylococcus pyogenes albus	41	times.
“ “ aureus	38	“
“ “ cereus albus ..	12	“
“ “ “ flavus ..	7	“
“ “ citreus	6	“
Streptococcus “	11	“
“ “ fœtidus	2	“
“ erysipelatis	2	“
Bacillus coli communis	2	“
“ pneumoniæ (diplococcus)	2	“
“ fluorescens liquidus	once.	
“ “ putridus	“	
Micrococcus tetragenus	“	

IV.—ASEPSIS AND ANTISEPSIS.

I.—*Germs are killed by heat:*

Moist heat (steam) kills in 10 minutes :

1. Bacillus anthracis at 120° Fahr. (49° Cent.).
2. B. anthracis spores at 212° Fahr. (100° Cent.).
3. Bacillus tuberculosis at 212° Fahr. (100° Cent.).
4. Staphylococcus pyog. albus at 143° Fahr. (62° Cent.).
5. Staphylococcus pyog. aureus at 136° Fahr. (58° Cent.).
6. Staphylococcus pyog. citreus at 145° Fahr. (63° Cent.).
7. Streptococcus pyogenes at 129° Fahr. (54° Cent.).
8. Gonococcus at 140° Fahr. (60° Cent.).

II.—*Germ*s are killed by many chemical substances.

1. Bichloride of mercury (corrosive sublimate):

Solution 1 : 500 kills ordinary germs in 10 seconds.

Solution 1 : 1,000 kills ordinary germs in 45 seconds.

Solution 1 : 2,000 kills ordinary germs in 1½ mins.

Solution 1 : 5,000 kills ordinary germs in 3 mins.

Solution 1 : 10,000 kills ordinary germs in 5 mins.

Solution 1 : 20,000 kills ordinary germs in 10 mins.

2. Carbolic acid :

Solution 1 : 20 kills ordinary germs in 15 secs.

1 : 40 " " 20-60
 secs.

1 : 60 kills ordinary germs in 4 mins.

3. Salicylic acid:

1 : 600 (Sat.) kills in 1 min.

1 : 1,000 (hot water cooled) kills in
4-5 mins.

4. Permanganate of potassium :

Solution 1 : 50 kills ordinary germs in 20 secs.

" 1 : 100 " " 1 min.

" 1 : 200 " " 2 mins.

5. Chlorine water 25 per cent., freshly prepared :

Kills ordinary germs in 1½ mins.

6. Peroxide of hydrogen :

1 : 8 kills ordinary germs in 1½ mins.

7. Alcohol 95 per cent.: Kills ordinary germs in 20 secs.

8. Argentic nitrate 1 : 5,000, or citrate 1 : 4,000, kills ordinary germs in 8 minutes.

9. Iodine :

Saturated alcoholic solution kills ordinary germs in 48 hours.

10. Iodoform powder or ethereal solution :
Kills ordinary germs in 12 hours. Ointment,
no effect.
11. Boric acid—any strength or form. *No effect.*
12. Formaldehyde 1-2 per cent. : Kills in 1 hour.

III.—*Aseptic and antiseptic materials:*

(a) *Moist heat* 140°–212° Fahr., by steam (Arnold's sterilizer) or boiling, will sterilize in 10 minutes: Cotton, gauze, pads, drainage tubes, silk, silkworm gut, horse-hair, towels, gowns, brushes, etc. Instruments sterilized by boiling for 10 minutes in water with sodium carbonate $\frac{3}{4}$ i to Oi.

(b) *Dry heat* of similar temperature will sterilize iodoform gauze, 10 per cent., with but slight loss of weight.

(c) *Heat of boiling alcohol*, 170° Fahr. for $\frac{1}{2}$ hour will sterilize catgut and kangaroo tendon. Saul's method: Boil ligatures in alcohol 150 parts, carbolic acid 50 parts, water 100 parts.

(d) Gauze: $\left\{ \begin{array}{l} 1. \text{ Iodoform,} \\ 2. \text{ Bichloride } 1 : 1,000, \\ 3. \text{ Creolin 2 per cent.,} \\ 4. \text{ Cyanide of Hg. and Zn. (Lister).} \\ 5. \text{ Balsam of Peru.} \end{array} \right\} \begin{array}{l} \text{℞ Iodoform } \frac{3}{4} \text{ iii,} \\ \text{Soapsuds, boiling,} \\ \text{3 iv,} \\ \text{Gauze } 2\frac{1}{2} \text{ yards.} \end{array}$

(e) Cotton, plain and medicated, same as gauze; sterilized by dry heat.

(f) Lint, wool, wood-wool, jute, oakum, etc.; sterilized by dry heat, or soaked in bichloride solution.

(g) Sponges $\left\{ \begin{array}{l} 1. \text{ Beaten in a bag to get sand out,} \\ 2. \text{ Soaked in acid water for few days,} \\ 3. \text{ Washed in water,} \\ 4. \text{ Soaked in solution of carbonate} \\ \text{or of hyposulphite of soda,} \\ 5. \text{ Soaked in oxalic acid, } \frac{3}{4} \text{ iv to} \\ \text{gallon.} \\ 6. \text{ Washed in water 10 minutes.} \\ 7. \text{ Kept in 6 per cent. carbolic, in} \\ \text{glass jar.} \end{array} \right.$
Rarely used in modern surgery.

(h) Sublimate solution, 1 : 1,000:

R { Bichloride of mercury $7\frac{1}{2}$ grains,
Chloride of sodium 15 grains, *or*
Ammonium chloride 3 grains, *or*
Tartaric acid 5 grains,
Water up to one pint.

(i) Sublimate tablets; Hg Cl_2 and tartaric acid, each $7\frac{1}{2}$ grains (gm 0.5); one of these in a pint = 1 : 1,000.

(j) Carbolic acid: 1 : 20 = 5 per cent.

1 : 40 = $2\frac{1}{2}$ per cent.

(k) Potassium permanganate solution: $\frac{3}{4}$ i to $\frac{5}{8}$ i.
A teaspoonful to a pint of water = 1 : 1,000.

(l) Saline solution, $\frac{6}{10}$ per cent., or 3 grains to the ounce, or about a teaspoonful to a pint of water.

(m) Boro-salicylic solution (Thiersch), salicylic acid 2 parts, boric acid 12 parts, water 1,000 parts.

(n) Aluminum acetate (Burow): Alum 24, lead acetate 38, water 1000. Let stand one day, filter.

(o) Creolin, 2 per cent.

(p) Peroxide of hydrogen, 3 per cent. Marchand or Oakland.

(q) Chlorine water 25 per cent.

IV.—Preparations for operation:

1. Surgeon's and assistant's hands:

(a) Scrub vigorously with green soap,

(b) Use nascent chlorine mixture (bleaching powder and washing soda), or alcohol 95 per cent.,

(c) In special cases rubber gloves.

2. Field of operation:

(a) Soft or green soap for 8 to 10 hours,

(b) Scrub well,

(c) Apply 1-20 carbolic solution, or alcohol for 1-2 hours.

V.—ABSCESS.

I.—*Suppuration* :

1. Diffused,
2. Circumscribed,
3. From free surface.

II.—*Abscess* :—Defined.

1. Pathology,—acute and chronic,
2. Fluctuation,
3. Aspiration,
4. Progress,
5. Bursting,
6. Treatment.—“ *Ubi pus ibi evacuatio*,”
7. Counter-opening and drainage.

VI.—ULCERATION.

I.—*Ulcers* :—1. Traumatic,

2. Defective nutrition, varicose veins.

3. Inflammatory,

4. Specific { Tubercular,
Syphilitic,
Cancerous, etc.

II.—“ *Diseases* ” of granulations :

1. Exuberance,
2. Indolence,
3. Sensitiveness (hyperæsthesia).

III.—*Treatment of ulcers*, (a) Position,IV.—*Burns and scalds*, (b) Support,

(a) Varieties,

(b) Causes,

(c) Treatment,

(d) Shock,

(e) Gastric ulcer.

(c) Strapping,

(d) Astringents,

(e) Antiseptics,

(f) Grafting,

(g) Circular incision.

VII.—CONTUSED, LACERATED AND GUN-SHOT WOUNDS.

I.—*Definition and diagnosis*.II.—*Dangers and significance*.III.—*Treatment and results*.

IV.—*Gunshot wounds :*

- A.—Dangers: 1. Clothing carried in with ball,
 2. Fascial penetration,
 3. Vessel “
 4. Bone “
- B.—Probe: 1. If wound is large and union hopeless,
 2. If union has failed,
 3. If septic,
 4. If in a cavity or a joint.

VIII.—GANGRENE.

I.—*Definition :*

- II.—*Synonyms :* { 1. Death of living tissues,
 2. Mortification,
 3. Sphacelus,
 4. Necrosis.

III.—*Varieties.*—Dry and moist.IV.—*Putrefaction.*—Changes after death.V.—*Causes :*

1. Pathological vessel changes :
 (a) Atheroma,
 (b) Syphilis,
 (c) Alcoholism,
 (d) Bright's disease,
 (e) Gout,
 (f) Diabetes,
 (g) Raynaud's disease,
 (h) Embolism or thrombosis,
 (i) Ergot,
 (j) Mercury,
 (k) Nerve lesions.
2. Traumatic and mechanical :
 (a) Arterial and venous occlusion :
 (b) Burns, caustics, frost,
 (c) Decubitus,
3. Bacterial changes:
 (a) Infectious fevers, *e. g.*, measles,
 (b) Phagedæna,

- (c) Sloughing.
- (d) Erysipelas, gangrene, œdema,
- (e) Boils and carbuncles,
- (f) Malaria,
- (g) Diabetes, senile gangrene,
- (h) Hospital gangrene.

VI.—*Boils*.—Their treatment.

VII.—*Carbuncles*.—Their treatment.

VIII.—*Treatment of gangrene* :

1. If aseptic or dry—expectant.
2. If septic or moist—wide and prompt surgical interference.

IX.—WOUND INFECTIONS.

1. Surgical fever,
2. Sapræmia,
3. Septicæmia, { (a) Simple,
4. Pyæmia, { (b) Phlegmonous,
5. Erysipelas, { (c) Gangrenous,
6. Erysipeloid, { (d) Migrating,
7. Tetanus, { (e) Metastatic,
- { (f) Facial (?)
8. Malignant œdema,
9. Hospital gangrene,
10. Glanders.
11. Actinomycosis,
12. Malignant pustule,
13. Insect bites and stings,
14. Snake bites,
15. Hydrophobia,
16. Tuberculosis.

SECTION II.

I.—FRACTURES—GENERAL CONSIDERATIONS.

I.—*Important subdivisions* :

1. Simple,
 2. Compound,
 3. Complicated,
 4. Gunshot.
- | | |
|---|---|
| { | <ul style="list-style-type: none"> (a) Joint, (b) Vessel, (c) Nerve, (d) Visceral lesion. |
|---|---|

II.—*Unimportant but convenient subdivisions :*

1. Complete :

- (a) Direction of fracture,
- (b) Site “ “
- (c) Number “ “

2. Incomplete :

- (a) Greenstick,
- (b) Fissured,
- (c) Depressed,
- (d) Impacted.

III.—*Unclassified subdivisions :*

- | | | |
|---|---|--------------------|
| 1. Spontaneous, | { | (a) Neoplasms, |
| 2. Pathological, | | (b) Nerve disease, |
| 3. Recent, or old fractures, | | (c) Osteo-porosis, |
| 4. Diastasis, or epiphyseal separation, | | (d) Osteomalacia. |
| 5. Ununited fracture. | | |

IV.—*Mechanical Causes:*

- 1. Direct violence,
- 2. Indirect “
- 3. Muscular action,
- 4. In utero, or parturition.

V.—*Symptoms of fractures:*

- 1. Deformity, externally and by X-ray examination,
- 2. False point of motion,
- 3. Crepitus,
- 4. Ecchymosis (late),
- 5. Localized pain,
- 6. Impaired function.

VI.—*Repair of fractures:*

- 1. Local lesions, aseptic fever,
- 2. Periosteal bridge ; its influence,
- 3. Fat embolism.
- 4. Callus : { (a) Exuberant,
- { (b) Faulty,
- { (c) Nerve entanglement.

VII.—*Diagnosis of fractures* (Dr. E. Eliot, Jr.):

- I.—Inspection: $\left\{ \begin{array}{l} (a) \text{ Swelling,} \\ (b) \text{ Ecchymosis,} \\ (c) \text{ Deformity.} \end{array} \right.$
- II.—Palpation: $\left\{ \begin{array}{l} (a) \text{ Local point of tenderness,} \\ (b) \text{ Bony irregularity,} \\ (c) \text{ False point of motion,} \\ (d) \text{ Crepitus.} \end{array} \right.$
- III.—Motion—active and passive.
- IV.—Mensuration—comparison with opposite side.

VIII.—*Treatment of fractures:*

- (a) Setting,
 (b) Rest,
 (c) Immobilization,
 (d) Extension,
 (e) Splints,
 (f) Muscular twitchings.

IX.—*Remote effects of fractures:*

- (a) Joint stiffness,
 (b) Atrophy of limb,
 (c) Painful callus and paralysis,
 (d) Delayed union,
 (e) Vicious union,
 (f) Non-union or false joint.

X.—*False Joint due to:*

- (a) Foreign bodies,
 (b) Necrosed bone,
 (c) Intervening soft parts, contraction of muscles
 (d) Defective nutrition of parts,
 (e) Constitutional disease,
 (f) Defective immobilization,
 (g) Separation of fragments— $\left\{ \begin{array}{l} \text{olecranon} \\ \text{patella.} \end{array} \right.$
 (h) Repeated fractures,

XI.—*Treatment of delayed union and non-union:*

- (a) Motion, rubbing fragments together,
 (b) Venous stasis,
 (c) Drilling,

- (*d*) Resection, with or without wiring, pegs or screw plates.

XII.—*Treatment of vicious union :*

- (*a*) Osteotomy,
(*b*) Refracture (dysmorphosteodiasis!).

II.—FRACTURES, SPECIAL.

I.—*Nasal bones :*

- (*a*) Recent: Replace thoroughly with instruments from within.
(*b*) Ancient: Refracture by chiseling or special forceps.

II.—*Malar Bones:*

- Open into antrum, and push up with a sound, if depressed.

III.—*Inferior Maxilla :*

- Usually compound. Wire together or use interdental splint.

IV.—*Clavicle :*

1. Site: Middle most common.
2. Complications:
 - (*a*) Vessels,
 - (*b*) Nerves,
 - (*c*) Pleura.
3. Treatment:
 - (*a*) Indications: Draw or push the shoulder outwards and upwards,
 - (*b*) Decubitus,
 - (*c*) Sayre's Dressing,
 - (*d*) Elbow sling.

V.—*Sternum, ribs and cartilages :*

1. Symptoms and situation,
2. Complications,
 - (*a*) Emphysema,
 - (*b*) Hæmoptysis,
 - (*c*) Pneumonia,
 - (*d*) Hæmo-pneumo-thorax.
3. Treatment: (*a*) Body bandage,
(*b*) Adhesive plaster.

VI.—*Scapula* :

1. Complications: Thorax lesions,
2. Treatment: None but immobilization by sling.

VII.—*Humerus*:

1. Site: (a) Anatomical neck,
(b) Epiphyseal separation,
(c) Head and tuberosities,
(d) Surgical neck,
(e) Shaft,
(f) Condyles.
2. Fractures of the Head—Note :
(a) Direction of shaft,
(b) Whether head is under acromion,
(c) Whether head rotates with shaft,
(d) Altered shape of shoulder.
3. Epiphyseal separation—Note :
(a) Age under eighteen years,
(b) Head does not rotate with shaft,
(c) Shoulder socket is not empty,
(d) Crepitus subdued,
(e) Shaft felt as a transverse surface,
(f) Recurs after reduction.
4. Surgical neck of humerus :
(a) Head is felt in socket,
(b) Peculiar displacement,
(c) Head does not rotate,
(d) Shoulder often is much broadened.
5. Anatomical neck of humerus :
(a) Exclude all other fractures,
(b) Peculiar to old age,
(c) Subsequent necrosis and suppuration.

VIII.—*Treatment* of all varieties :

- (a) Give ether,
- (b) Reduce displacement,
- (c) Use body as principal splint,
- (d) Let forearm act as counter-extension,
- (e) Do not put pad in axilla, as it compresses vessels and nerves.

IX.—*Elbow :*

- (a) Supra-condyloid,
- (b) Diastasis (through epiphysis),
- (c) Through condyles,
- (d) Fractures involving the joint,
 - A. Shaped like a T,
 - B. Through external condyle,
 - C. Through internal condyle, with radius dislocation.

X.—*Forearm :*

- 1. Kinds : (a) Single bone,
- (b) Both bones.
- 2. Treatment :
 - (a) Special indication is to prevent approximation of both bones by supination and splints,
 - (b) Prevent wrong union of fragments, by careful adjustment.

XI.—*Lower end of radius (Colles') :*

- (a) Produced by fall on palm of hand,
- (b) Treatment :
 - 1. Reduction : A. Twisting hand,
 - B. Pressure,
 - C. Flexion and extension.
 - D. Use ether or gas.
 - 2. Fixation :
 - (a) Plaster of Paris,
 - (b) Adhesive plaster (Willard Parker),
 - (c) Palmar and dorsal splints.
 - 3. Avoid early passive motion, but start finger movements early.

XII.—*Pelvis :*

- (1) False pelvis,
- (2) True pelvis, .
- Treatment : Body bandage,
- Adhesive plaster.
- Complications :
 - Rupture of bladder or urethra.

XIII.—*Femur*:

1. Fractures of neck :

- (a) Intracapsular,
- (b) Extracapsular,
- (c) Complete,
- (d) Impacted with or without splitting trochanter.

N.B.—Fracture of acetabulum :

If upper lip broken, may simulate dorsal dislocation or fracture of neck.

Fractures of neck may be :

- Close to anterior surface,
- Close to trochanter.

Principal symptoms, fracture of neck of femur :

- (a) Flattening of hip,
- (b) Trochanter drawn up or sunken in, (Nelson's, Bryant's, Morris' tests).
- (c) Rotation changed :
 - 1. Eversion,
 - 2. Helplessness.
- (d) Shortening (a) intracapsular, $\frac{1}{2}$ to 1 inch.
 (b) extracapsular, $1\frac{1}{2}$ to 3 "
 Both overcome by traction.
- (e) Crepitus—often subdued or absent, but elicited by traction,
- (f) Pain.

Risks, (a) Immediate :

- 1. Bedsores,
- 2. Hypostatic pneumonia,

(b) Later :

- 1. Non-union,
- 2. Deformity.

Results, (a) Bony union,

- (b) Fibrous union,
- (c) Eburnation.

Treatment ; Sand or salt bags, avoid much motion or handling.

Extension,

Plaster of Paris (alone),

“ “ (Senn's method).

2. Upper third of femur :

- (a) Note tilting of fragments (upper, upward and outward),
- (b) Put the lower fragment into the axis of the upper,
- (c) Treatment— { (a) Hodgen's splint,
 (b) Allis' plan,

3. Middle third and lower third :

- (a) Vertical extension in children,
- (b) Buck's extension, Volkmann's splint.

4. Condyles :

- Note influence of gastrocnemius,
- Theory *vs.* practice. Tenotomy in rare cases.
- Hodgen's splint. Double inclined planes.

XIV.—*Patella*:

1.—Causes of usual fibrous union :

- (a) Action of quadriceps extensor,
- (b) Inversion of fibrous tissues between fragments.

2. Risks of ordinary treatment :

- (a) Uncertain gait,
- (b) Refracture,
- (c) Fracture of other patella.

3. Risks of operative treatment :

- (a) More or less ankylosis,
- (b) Suppuration of joint,
- (c) Amputation,
- (d) Death.

4. Ordinary treatment (old method) :

- (a) Compression of joint,
- (b) Approximation of fragments,
- (c) Immobilization of limb,
- (d) Duration, six weeks to three months.

5. Operative treatment :

- (a) Aspiration of blood from joint,
- (b) Suturing fragments,
- (c) Traction sutures,
- (d) Duration, three to six weeks,
- (e) Advantages—bony union, restored function,

XV.—*Fibula*—Upper end :

Note possible injury to the external popliteal nerve.

XVI.—*Ankle joint*:

1. Pott's fracture,
2. Sprains,
3. Fracture of os calcis.

III.—DISLOCATIONS.

I.—*Kinds*:

1. Complete,
2. Simple, or compound, or complicated :
 - (a) Nerve,
 - (b) Vessel,
 - (c) Visceral lesion,
 - (d) Fractured bone.
3. Bilateral or double,
4. Traumatic or pathological,
5. Congenital or acquired,
6. Recurrent or habitual.

II.—*Signs*:

1. Deformity,
2. Loss of motion,
3. Impairment of function,
4. Crepitus, soft.

III.—*Reduction impeded by*:

1. Interposition of capsule, muscles, tendons,
2. Contraction of muscles,
3. Swelling of soft parts,
4. Overriding of joint ends,
5. Complication of fracture.

IV.—*Indications for treatment*:

1. Draw or twist dislocated end of bone towards the normal position,
2. Overcome muscular contractions (anæsthesia),
3. Overcome overriding by position and manipulation.

V.—*Risks of reduction:*

1. Skin damage,
2. Vessel and nerve damage,
3. Fracture by twisting, etc.,
4. Joint inflammation and ankylosis.

IV.—DISEASES OF BONE.

I.—*Periostitis:*

- | | | |
|------------------|---|-------------------------------|
| | { | (a) Traumatic, |
| | { | (b) Syphilitic, |
| 1. Non-pyogenic: | { | (c) Gouty, |
| | { | (d) Gonorrhœal, |
| | { | (e) Rheumatic, |
| | { | (f) Drugs. |
| 2. Pyogenic: | { | (a) Of similar origin, |
| | { | (b) Formation of abscess, |
| | { | (c) Concurrent osteomyelitis. |

II.—*Osteomyelitis:*

1. Acute:

- (a) Often confounded with (a) Ac. rheumatism,
(b) Typhoid fever.

- (b) Varieties: { 1. Simple,
2. Multiple,
3. Recurring.

- (c) Treatment: { 1. Early bone section,
2. Drainage.

- (d) Results: { 1. Internal or external abscess (Pott's puffy tumor),
2. Necrosis,
3. Caries,
4. Epiphysitis,
5. Joint and visceral involvement.

2. Chronic—usually non-pyogenic:

- (a) Causes: { 1. Syphilis,
2. Gout,
3. Rheumatism,
4. Irritation, repeated or chronic,
5. Obscure forms: Charcot's Joint, Arthritis Deformans.

- (b) Results: { 1. Deformity,
2. Chronic ulceration,
3. Necrosis.

III.—*Irregularities of growth :*

1. Defective nutrition :

- (a) Bone atrophy,
- (b) Malacostia,
- (c) Rickets,
- (d) Contracted pelvis,
- (e) Bow-legs, etc.,
- (f) Pigeon breast, etc.

2. Excessive nutrition :

- (a) Bony hypertrophy,
- (b) Bow-legs,
- (c) Knock-knee,
- (d) Exostosis,
- (e) Osteophytes,
- (f) Enchondrosis,
- (g) Leontiasis,
- (h) Acromegalia.

3. Treatment :

- (a) Bow-legs: $\left\{ \begin{array}{l} (a) \text{ Manual reposition,} \\ (b) \text{ Simple osteotomy,} \\ (c) \text{ Cuneiform osteotomy.} \end{array} \right.$

- (b) Knock-knees: Condylloid osteotomy,
(Macewen).

- (c) Exostoses and enchondromata :

- (1) Frontal sinus, cerebral risk in removal,
- (2) Nose,
- (3) Ear,
- (4) Ivory exostoses,
- (5) Under toe-nail.

Treatment, extirpation.

IV.—*Suppurative Osteomyelitis :*

1. Terms: $\left\{ \begin{array}{l} (a) \text{ Cloaca,} \\ (b) \text{ Sequestrum,} \\ (c) \text{ Involucrum.} \end{array} \right.$

2. Necrosis and chronic abscess :

- (a) Of compact structures of shaft :
 - 1. Exfoliation,
 - 2. Total necrosis,
 - 3. Frequent after amputation.

- (b) Of cancellous structures and epiphysis :
 - 1. Bone abscess,
 - 2. Arrest of growth,
 - 3. Joint involvement.
- 3. Diagnosis.—Detection of dead and separated bone by probing.
- 4. Treatment of bone abscess and necrosis :
 - (a) Early subperiosteal resection,
 - (b) Bone solvents (?)
 - (c) Sequestrotomy,
 - (d) Osteotomy.
- 5. Filling up of bone cavity after operation :
 - (a) Skin depression and tacking down,
 - (b) Blood clot,
 - (c) Decalcified bone or bone depression,
 - (d) Fresh bone grafting,
 - (e) Gutta percha,
 - (f) Plaster of Paris.

V.—*Non-suppurative necroses :*

- (a) Phosphorus,
- (b) Mercury,
- (c) Caries sicca.

VI.—*Tumors of Bone :*

- 1. Myelo-sarcomata,
- 2. Sarcoma, $\left\{ \begin{array}{l} (a) \text{ Small round cells,} \\ (b) \text{ Spindle cells,} \\ (c) \text{ Giant cells.} \end{array} \right.$
- 3. Chondromata,
- 4. Chondro-sarcomata,
- 5. Carcinomata,
- 6. Hydatids,
- 7. Aneurisms and angeiomata.

V.—BURSITIS, ETC.:

- 1. Fleischmann's bursa (Ranula),
- 2. Subhyoid,
- 3. Subacromial,
- 4. Olecranon,

5. Trochanteric,
6. Prepatellar,
7. Subligamental-patellæ,
8. Ham,
9. Bunion,
10. Teno-synovitis, $\left\{ \begin{array}{l} (a) \text{ Simple,} \\ (b) \text{ Compound,} \\ (c) \text{ Tubercular.} \end{array} \right.$
11. Palmar and digital abscess,
12. Dupuytren's contraction,
13. Webbed fingers.

VI.—DISEASES OF LYMPHATICS.

I.—*Lymphangitis*:

1. In patches—reticular,
2. In lines—tubular,
3. Superficial—easily recognized,
4. Deep—often simulates cellulitis.

II.—*Lymphadenitis*:

1. Acute: $\left\{ \begin{array}{l} (a) \text{ Axilla,} \\ (b) \text{ Neck;} \\ (c) \text{ Groin.} \end{array} \right.$
2. Chronic,—tubercular,
3. Treatment.
 - (a) Injection of iodine or iodoform,

\mathcal{R} Iodoform, 3 i,
 Ether sulph., 3 v,
 Ol. olivæ, 3 x.
 - (b) Scraping,
 - (c) Extirpation.

III.—*Lymphangeioma and Lymphangiectasis*:

1. Kinds: $\left\{ \begin{array}{l} (a) \text{ Cutaneous } \left\{ \begin{array}{l} 1. \text{ Tumors,} \\ 2. \text{ Elephantiasis,} \\ 3. \text{ Pachydermatocele.} \end{array} \right. \\ (b) \text{ Submucous, } e. g., \text{ chyluria,} \\ (c) \text{ Subcutaneous,} \\ (d) \text{ With angeioma.} \end{array} \right.$
2. Causes: $\left\{ \begin{array}{l} 1. \text{ Filaria Sanguinis Hominis,} \\ 2. \text{ Mosquitoes.} \end{array} \right.$

IV.—*Lympho-sarcoma*: Hodgkin's disease.

V.—*Lympho-carcinoma*.

VII.—DISEASES OF VESSELS.

I.— <i>Wounds of veins and arteries</i>	(a) Punctured
Methods of repair.	(b) Contused
Dangers.	(c) Lacerated
Treatment :	(d) Gunshot
Murphy's suture.	(e) Incised
	(f) Ruptured

II.—*Accidents during certain operations:*

- (1) Wound of carotid in tonsillotomy.
- (2) Wound of palmar arch in operations on the hand.
- (3) Wound of thyroid isthmus, or of a vein in tracheotomy.
- (4) Entrance of air into veins.
- (5) Wound of intercostal in thoracotomy.
- (6) Wound of epigastric in laparotomy, etc.

III.—*Aneurism:*

1. Classes:

- (a) Spontaneous or Idiopathic (previous arterial disease).
- (b) Traumatic :
 1. Rupture,
 2. Ulceration,
 3. Puncture.
- (c) According to shape, etc. :
 1. Fusiform (tubular), or true,
 2. Saccular, or false,
 3. Circumscribed,
 4. Diffused,
 5. Dissecting.
- (d) According to site :
 1. External,
 2. Internal.

2. Symptoms:

- (a) Pulsation,
- (b) Compressibility,
- (c) Situation along the artery,
- (d) Expands after compression,
- (e) Bruit.

3. Differential diagnosis :
 - (a) Abscess or tumor over an artery,
 - (b) Angeio-sarcoma,
 - (c) Enlarged aorta,
 - (d) Pulsating liver,
 - (e) Goitre.
4. Destroys life :
 - (a) By rupture, internally, externally.
 - (b) By pressure on trachea, etc.
5. Spontaneous cure :
 - (a) How effected,
 - (b) Factors favoring.
6. Treatment of external aneurism :
 - (a) Ligature

{	<ol style="list-style-type: none"> (1) Antyllus A. D. 200-300, (2) Anel 1710, (3) Hunter 1785, (4) Brasdor 1780, (5) Wardrop 1815, (6) Ballance's knot.
---	---
 - (b) Flexion.
 - (c) Esmarch bandage.
 - (d) Digital or instrumental compression.
 - (e) Extirpation.
 - (f) Manipulation (Ferguson, 1852).
 - (g) Amputation if: gangrene sets in, sac ruptures, sac suppurates; joint or bone complication.
7. Treatment of internal aneurism :
 - (a) Tuffnell's (1864): Diet, position, quiet.
 - (b) Balfour's: potassium iodide.
 - (c) Acupuncture (Simpson).
 - (d) Galvanopuncture (Phillips, 1829).
 - (e) Insertion of wire or catgut (Loreta).
 - (f) Macewen's plan—needling.
8. Arterio-venous aneurism :
 - (a) With tumor = varicose aneurism.
 - (b) Without tumor = aneurismal varix.
 - (c) Treatment :
 1. Ligature artery above and below tumor,
 2. Extirpation.

9. Orbital aneurism.
 10. Cirroid “
 11. Nævus—Treatment: $\left\{ \begin{array}{l} (a) \text{ Cautery,} \\ (b) \text{ Electrolysis,} \\ (c) \text{ Multiple incision.} \end{array} \right.$

VIII.—TUMORS.

1. *Definitions:*

- (a) A tumor is a new formation not inflammatory in origin, and is more or less in conformity with the tissue in which it has originated, but having no physiological function.
 (b) All true tumors are formed from previously undeveloped cells.
 (c) Cysts are formed from pre-existing sacs or lobules by accumulation of secretions or excretions.

2. *Causes of true tumors:*

1. Heredity, 11 per cent.,
2. Trauma, 11 per cent.,
3. Inflammation and prolonged irritations,
4. Anomalous embryonic arrangement,
5. Parasites and germs.

3. *Classification:*

- (a) Malignant and innocent,
 (b) Homologous and heterologous,
 (c) Homoplastic and heteroplastic.
 (d) Formed from $\left\{ \begin{array}{l} 1. \text{ Epiblast,} \\ 2. \text{ Hypoblast,} \\ 3. \text{ Mesoblast.} \end{array} \right.$
 (e) Morphological division:
 I. Connective tissue tumors,
 II. Epithelial tumors,
 III. Dermoids,
 IV. Cysts—only for convenience.

4. *Frequency and sites:*

According to Weber in 1013 cases:

Mouth and maxillæ	217,
Glands	174,
Bones (excl. maxillæ)	161,
Skin	93,
Genitals (male)	86,
Lungs	64,
Nose and pharynx	56,
Eyes and orbits	41,
Genitals (female)	31,
Intestine and anus	13,
Urinary organs	13.

5. *Benign or innocent tumors:*

- (a) Are of slow growth,
- (b) Usually encapsulated,
- (c) Do not contaminate adjacent glands,
- (d) Do not infiltrate,
- (e) Do not recur after *complete* removal,
- (f) Do not disseminate,
- (g) Do not imperil life except mechanically.

6. *Malignant tumors:*

- (a) Are of rapid growth,
- (b) Usually not encapsulated,
- (c) Affect adjacent glands generally,
- (d) Infiltrate,
- (e) Return after removal,
- (f) Disseminate,
- (g) Destroy life,
- (h) The connective tissue group contains *one* malignant genus, viz., *sarcoma*.
- (i) The epithelial group contains *two* malignant genera, *epithelioma* and *carcinoma*.
- (j) All other tumors are benign.

7. *Group I.—Connective tissue tumors:*

- 1. Lipomata,
- 2. Chondromata,
- 3. Osteomata,

4. Odontomata,
5. Fibromata
6. Myxomata,
7. Gliomata,
8. Neuromata,
9. Angeiomata,
10. Lymphangeiomata,
11. Sarcomata,

{ (a) Simple,
(b) Molluscum fibrosum,
(c) Neuro-fibroma,
(d) Keloid.

Tissues of immature connective-tissue with cells preponderating.

- (a) Round-celled sarcoma, occurs everywhere, at all ages.
- (b) Spindle-celled sarcoma,
 - (a) Often with hyaline cartilage,
 - (b) Often of slow growth,
 - (c) Prognosis more favorable.
- (c) Lympho-sarcoma,

Cells resemble lymph-gland cells.
- (d) Myeloid-sarcoma,
 - (a) Like marrow of young bone,
 - (b) Often capsulated,
 - (c) Prognosis more favorable.
- (e) Sarcoma disseminates,
 - (a) Usually by venous channels,
 - (b) Rarely by lymph channels.
- (f) Treatment of sarcoma,
 - (a) Removal in accessible positions,
 - (b) In bone, amputation above adjoining joint.

8. Group II.—*Epithelial tumors* :

1. Papillomata, { (a) Skin warts,
(b) Cutaneous horns,
(c) Villous papillomata,
(d) Intracystic warts,
(e) Psammomata.
2. Epitheliomata,

Differ from warts in not being limited by a basement membrane, but its cells pass into the connective tissue.

Treatment :

- (a) A wide and early removal, including enlarged adjacent glands.
- (b) Look out for crossed gland—infection, in case of tongue especially.
- (c) Operation makes life easier and prolongs it.
- (d) In a moderate but increasing percentage a cure is effected,—*i. e.*, no recurrence for 3 years or more.
- (e) Recurrence, except in special cases, means uselessness of further operations.

3. Adenoma :

Constructed on the type of, and grows in connection with, a secreting gland. Does not produce secretion of the gland it mimics. Is usually a benign growth.

4. Carcinoma :

Grows from pre-existing gland, and mimics it, but, unlike adenoma, the mimicry is incomplete. Irregular epithelial clusters fill the acini.

Old terms : (a) Scirrhus,

(b) Encephaloid, medullary,

(c) Colloid.

9. *Group III.—Dermoid tumors* : Containing skin or mucous membrane where such are not normally found.

Divided into :

1. Sequestal Dermoids :

Where in embryonic life coalescence occurs between skin and corresponding surfaces, *e. g.*, along line of union. (1) Face, (2) scalp and dura mater, (3) median line of body.

2. Tubulo-dermoids : From obsolete canals.

1. Thyroglossal,

2. Lingual,

3. Lateral cervical (branchial clefts),

4. Median cervical (Subhyoid bursa),

5. Infundibulum and pituitary gland, in pharynx,

6. Median and lateral accessory thyroid,
7. Posterior and anterior rectal.
3. Dermoid patches, moles, etc.,
4. Implantation dermoids.
10. *Group IV.—Cysts :*
 - Not true tumors.
 - Derived from dilatation of pre-existing tubules or cavities.
 - 1. *Retention cysts :*
 - From dilatation of obstructed gland-duct.
 - (a) Hydrometra,
 - (b) Hydrosalpinx,
 - (c) Hydrocholecyst,
 - (d) Galactoceles, etc.
 - Obstruction due to :
 - (a) Inflammation,
 - (b) Cicatrices and stenoses,
 - (c) Tumor pressure,
 - (d) Flexions of duct (intermittence),
 - (e) Valvular closure,
 - (f) Altered secretion,
 - (g) Foreign body, concretion, etc.
 - 2. *Tubulo Cysts :* or dilatation of functionless ducts.
 - (a) Vitello-intestinal,
 - (b) Parovarian,
 - (c) Gaertner's,
 - (d) Urachus,
 - (e) Testes {
 - Cystic adenoma,
 - Organ of Giralès,
 - Kobelt's tubes,
 - Hydatid of Morgagni.
 - 3. *Hydrocele:*
 - Collection of fluid in :
 - (a) Tunica vaginalis,
 - (b) Canal of Nuck,
 - (c) Ovary, etc.
 - 4. *Gland cysts :*
 - Ranula,
 - Pancreatic cysts,

Chyle cysts,
Lachrymal cysts,
Renal cysts, single and multiple,
Galactoceles.

5. *Pseudo-cysts* :
Diverticula,
Bursæ,
Neurocysts (spina bifida),
Hydatids.

PART II—REGIONAL SURGERY.

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SECTION I—THE MAMMARY GLANDS.

I.—DISEASES OF THE BREASTS.

1. *Polymastia*—(a) In normal lines,
(b) Abnormal sites, *e. g.*, thighs.
Allied conditions :
(a) Accessory mammæ,
(b) Champney's axillary plaque.
2. *Hypertrophy of mamma* :
(a) Infantile,
(b) Adult,
 1. Temporary { 1. Pregnancy,
2. Lactation,
3. Menstruation.
 2. Permanent, 14–30 years.
 3. Usually general, sometimes localized.
3. *Gynæcomastia* :
Hypertrophied mamma in male adult. No
change in other sexual characteristics.
4. *Diseases of nipples* :
(a) Fissure,
(b) Sebaceous cyst,
(c) Papilloma,
(d) Chancre,
(e) Chancroid,
(f) Eczema, chronic,
(g) Paget's disease.

5. *Tumors of the breast :*

- (a) Lipoma—rare, generally outside of the gland,
 - (b) Chondroma—rare,
 - (c) Galactocele—infrequent ; with or subsequent to lactation,
 - *(d) Fibroma, or cystic fibroma, under puberty and upwards,
 - (e) Cystoma, 30-50 years.
 - *(f) Adenoma, 15-40 years ; fibro-cyst-adenoma (20-40 years).
 - (g) Myxoma—very rare (40-50).
 - *(h) Sarcoma—20-30 years.
 - *(i) Carcinoma—35-60 years.
 - 1. Tubular,
 - 2. Acinous.
- * = common.
- (j) Tumors and ulcers of infectious origin,
 - (1) Syphilitic gumma,
 - (2) Tubercular mastitis and ulceration.

6. *Malignant growths :*A.—*Sarcoma,*

Occurs 4 per cent. of all breast tumors,

- (a) Pure sarcoma, not large, 20 per cent. of all sarcomata.
- (b) Adeno-sarcoma 80 per cent., often cystic and quite large.

Signs: No adhesion to skin and subjacent parts. Glands sometimes involved and ulcerate. When ulcers present, they are fungating, edges not infiltrated, grow rapidly, veins enlarged ; 20-50 years.

B.—*Carcinoma :*

- (a) Tubular,
- (b) Acinous,

Frequency of breast tumors:

Carcinoma.....	79	per cent.
Sarcoma.....	4	" "
Benign	15	" "
Cysts	2	" "

C.—Differential diagnosis of breast tumors:

(a) Benign:

Age, 20 to 40,
Circumscribed,
Mobile,
Non-adherent to skin and deep parts,
No gland infection,
No retracted nipple.

(b) Malignant:

Age, average 48 years,
Possible 20-70 years,
Hard, irregular,
Fixed, adherent to skin ("pigskin"),
Retraction of nipple 52 per cent.,
Not very rapid growth,
Glands infected,
Late ulceration with fungation, cachexia and
metastases.

D.—Treatment of Carcinoma Mammæ:

I.—Caustics (inadvisable).

II.—Surgical operation:

(a) Average duration of life, in unoperated cases is 44 months; in operated cases with recurrence, 60 months.

(b) Average prolongation of life, 16 months.

(c) Recurrence:

Within 6 months after operation in 60 per cent. cases.

From 6 months to 2 years after operation in 32 per cent. cases.

General rule: (Volkmann)

If no recurrence in 1 year, a cure is possible;

If no recurrence in 2 years, a cure is probable;

If no recurrence in 3 years, a cure is almost certain.

II.—AMPUTATION OF THE BREAST.

Operation memoranda :

- (a) In 47 per cent of cases where no glands are felt through the skin, infected axillary glands are found.
- (b) Infected glands are also found in Mohrenheim's space, and also above the clavicle.
- (c) Infection of supra-clavicular glands is sometimes considered a contra-indication.
- (d) Besides the axillary routes of gland infection, it can also occur *via* pectoral fasciæ and muscles (Haidenhain).
- (e) Avoid nerve damage, and especially the two subscapular nerves, the long thoracic, etc.
- (f) Skin-grafting can be used if wound cannot be closed. Better as a secondary operation.

(g) *Technique :*

1. Run incision below and above breast, 1 to 1½ inches from tumor and prolong above anterior axillary fold to below attachment of the pectoralis major.
2. Make the lower incision first, so as to avoid obscuring by blood from above.
3. Dissect off skin in upper flap up to clavicle.
4. Do not fasten arm too much upward, lest paralysis follow.
5. Remove whole gland at once, not piecemeal.
6. Expose axillary vein early to avoid its injury.
7. Ligate small veins early, and at a distance from parent trunk.
8. Remove the pectoralis major, except the clavicular portion, the pectoralis minor and axillary fat and glands.

SECTION II—THE GENITO=URINARY ORGANS.

I.—THE PENIS AND URETHRA.

I.—*Malformations of the penis :*

- (a) Absence of the penis,
- (b) Double penis,
- (c) Abnormal size of penis,
- (d) Curvature and scrotal adhesions,
- (e) Epispadias,
- (f) Hypospadias,
- (g) Phimosis and preputial complications,
- (h) Shortened frænum,
- (i) Hermaphroditism, true and false.

II.—*Malformations of the urethra :*

- (a) Atresia and narrowing of meatus,
- (b) Meatus with "four lips,"
- (c) Congenital strictures,
- (d) Valves,
- (e) Dilatations and pouches.

III.—*Phimosis may produce :*

- 1. Urinary troubles (mechanical),
- 2. Dilatation of prepuce,
- 3. Formation of and arrest of calculus,
- 4. Balanitis,
- 5. Hernia (especially in children),
- 6. Prolapsus ani,
- 7. Premature sexual excitement,
(e.g. masturbation ; reflex neuroses) ;
- 8. Intensified venereal troubles,
- 9. Impaired coitus,
- 10. Paraphimosis,
- 11. Epithelioma of penis.

IV.—*Injuries and diseases of penis :*

- (a) Wounds and contusions,
- (b) Strangulation and gangrene,
- (c) Fracture (?),
- (d) Luxation (?),
- (e) Gouty or calcareous plaques,

(f) Skin affections { Herpes,
Eczema,

(g) Growths :

1. Vegetations,
2. Sebaceous tumors,
3. Elephantiasis, true and false,
4. Epithelioma,
5. Sarcoma,
6. Fibroma,
7. Angeioma and aneurism.

V.—*Injuries and diseases of urethra (non-venereal) :*

- (a) Contusions and abrasions (sounds and catheters),
- (b) Wounds and lacerations,
- (c) Urinary and urethral fever,
- (d) Urinary abscess and extravasation,
- (e) Fistula, { 1. Balanitic,
2. Penile,
- (f) Polypus, { 3. Perineal,
- (g) Calculus,
- (h) Foreign bodies.

VI.—*Lacerations and wounds of urethra :*

Urethral Traumatism may produce

- (a) Hemorrhage,
- (b) Extravasation of urine,
- (c) Retention “ “ ,
- (d) False passage,
- (e) Urethritis,
- (f) Pus infection and abscess,
- (g) Urinary fistula,
- (h) Curvature of penis,
- (i) Intractable stricture.

Treatment :

- (1) For hemorrhage—
Pressure—external or internal.
- (2) For retention of urine—
Aspiration (?), catheter, perineal incision.
- (3) For extravasation of urine—
Incision—irrigate.

(4) For laceration—

Incision, suture and drainage.

Results—Stricture—(sounds).Fistula . { early,
 { late.

II.—THE BLADDER.

I.—*Extravasation of urine* may be due to :

- (a) Strictured urethra,
- (b) Dilated follicles,
- (c) Wounded urethra,
- (d) Ulceration or rupture of urethra,
- (e) External injury,
 - 1. Wounds, {
 - 2. Contusions, { in perineum,
 - 3. Fractures of pelvis.

II.—*Malformations, malpositions and injuries of the bladder:*

- 1. Double bladder,
- 2. Exstrophy (sacro-iliac suture),
- 3. Patent urachus { Umbilical fistula,
- { Allantoic cysts,
- 4. Hernia of bladder,
- 5. Wounds { Gunshot,
- { Incised and punctured (catheter),
- 6. Rupture of bladder.

*Causes :*A.—*Traumatic*, injuries with or without fracture of pelvis :

- (a) Surgical instruments,
- (b) “ over distension,
- (c) Parturition.

B.—*Pathological :*

- (a) Diseased bladder (foetal rupture),
- (b) Sacculated “
- (c) Ulcerated “
- (d) Retention from obstruction.

*Site of rupture :**Dangers:*

- 1. Intraperitoneal— Peritonitis,
- 2. Extraperitoneal— Urinary extravasation.

Diagnosis :

1. By testing bladder capacity,
2. " " " distensibility (Weir, 1887),
3. " exploratory incision.

Treatment :

For intraperitoneal,

Laparotomy and drainage.

For extraperitoneal,

Incision and perineal drainage.

III.—*Foreign bodies in the bladder :*

Introduced in (a) Masturbation,
 (b) Defective catheters,
 (c) Wounds and abscesses.

To be removed by (a) Lithotrite or Guyon's hook,
 (b) Lithotomy.

IV.—*Tumors of the bladder :*

1. *Benign :* (a) Papilloma,
 (b) Myxoma (polyp),
 (c) Myoma,
 (d) Angeioma,
 (e) Cysts { Hydatid } rare.
 { Dermoid }

2. *Malignant :*

A.—Sarcoma, (a) Fibro-sarcoma,
 (b) Lympho-sarcoma,
 (c) Myo-sarcoma,
 (d) Round and spindle sarcoma.

B. Carcinoma, (a) Epithelioma,
 (b) Alveolar.

Forty-three per cent. of vesical tumors are at or near left urethral orifice,

Twenty-six per cent. of vesical tumors are at or near right urethral orifice.

Symptoms of tumor of the bladder :

1. Hemorrhage (Guyon's 3 glass test, also rectal pressure test. Note, most blood in urine last passed.),

2. Cystitis,
3. Gelatinous urine,
4. Tumor—determined by :
 - (a) Sounding,
 - (b) Bimanual examination,
 - (c) Cystoscope,
 - (d) Lithotrite,
 - (e) Exploratory incision.
5. Urinary shreds.

Differential diagnosis :

Hematuria—principal symptom ; may also be found with :

1. Hypertrophy of prostate,
2. Stone in bladder,
3. Acute cystitis,
4. Tubercular cystitis,
5. Ulceration and fissure of neck of bladder,
6. Bilharzia Hematobia (Egypt),
7. *Filaria Sanguinis Hominis* { South America,
India,
China.
8. Renal neoplasms and calculi.

For cystoscopic examination :

1. Have medium clear,
2. Avoid bladder wall,
3. Examine base first.

Treatment :

For hemorrhage, { (a) Hot water irrigations,
(b) Aspiration,
(c) Internal medication.

“ tumor, { (a) Extirpation
(use glass vaginal speculum
for vesical exploration),
(b) Extirpation with resection of
bladder,
(a) partial,
(b) complete.

Disposition of Ureters, if involved.

Palliative operation on unremovable tumors.

III.—THE PROSTATE.

I.—*Prostatic Abscess:*

(a) From the urethra :

Acute—1. Gonorrhœa,

2. Infectious instrumentation
(catheters).

(b) From the bladder :

Chronic—1. Stone,

2. Cystitis from hyper-
trophy of the prostate.

May evacuate into

1. Urethra,
2. Rectum,
3. Perineum.

II.—*Hypertrophy of the Prostate :*

1. *Produces:*

(a) Dilatation and elongation of prostatic urethra,

(b) Elevation of vesical outlet,

(c) Obstruction of venous circulation.

2. *Results in:*

(a) Residual urine : Decomposition,

(b) Hypertrophy of vesical wall,

(c) Dilatation of the bladder,

1. Atony (a flabby bag),

2. Incontinence,

3. Overflow (retention).

(d) Sacculation of bladder,

(e) Dilatation of ureters and pelves.

3. *Infection begets :*

(a) Cystitis,

(b) Epididymitis,

(c) Surgical kidney,

(d) Prostatic abscess.

4. *Treatment :*

As to bladder :

1. Empty bladder (catheter),

2. Correct the infection,

3. Permanent drainage.

As to prostate itself:

1. Prostatic dilatation,
1. Excision,
 - (a) Internal (McGill, Bottini),
 - (b) External (Alexander),
3. Castration,
4. Excision of vas deferens,
5. Prostatic dilatation (Harrison).

IV.—RETENTION OF URINE, CYSTITIS AND CALCULI.

I.—*Retention of urine :*

A. From paralysis and atony :

- (a) Lesion of cerebro-spinal system,
- (b) Shock from distant injuries,
- (c) Certain medicines, as opium, etc.,
- (d) Debility from exhausting disease,
- (e) Hemorrhoids, peritonitis, etc.

B.—From Obstruction :

- (a) Phimosi or priapism,
- (b) Urethral stricture, (a) Spasmodic (hysteria),
(b) Organic.
- (c) Laceration of urethra,
- (d) Acute prostatitis,
- (e) Hypertrophy of prostate,
- (f) Tumors of prostate,
- (g) Stone, (a) In prostate,
(b) In urethra,
(c) In bladder,
- (h) Hemorrhage in bladder,
- (i) Extra-vesical tumor (Engelisch),
- (j) Hernia of the bladder.

II.—*Cystitis:*

A.—From the prostate :

- (a) Violence,
- (b) Urethral infection.

B.—From the bladder :

- (a) Violence,
- (b) Purulent inflammation,
From (a) Prostate,
(b) Rectum, direct or indirect.
- (c) Tubercular infection.

C.—From the kidney :

- (a) Gravel,
- (b) Purulent infection,
- (c) Tubercular infection.

Varieties :

1. Simple,
2. Ammoniacal ; Pneumaturia, $\left\{ \begin{array}{l} \text{Diabetes,} \\ \text{Vesico-intestinal} \\ \text{fistula,} \end{array} \right.$
3. Gangrenous,
4. Diphtheritic,
5. Tubercular.

*III.—Stone in the bladder :**I.—Origin :*

1. Renal,
2. Bladder,
3. Prostate.

II.—Retrograde changes from :

Albumin	$C_{72}H_{112}N_{18}O_{22}S$	Uric Acid	$C_5H_4N_4O$
Tyrosin	$C_7H_{11}NO_3$	Oxalic Acid	$C_2H_2O_4$
Hippuric Acid	$C_9H_9NO_3$	Urea	CH_4N_2O
Leucin	$C_6H_{13}NO_2$	Ammonia	NH_3
Cystin	$C_6H_6NO_2S$	Carbonic Acid	CO_2
Xanthin	$C_5H_4N_4O_2$	Water	H_2O

*III.—Kinds of Deposit : C = common, R = rare.**1.—Due to defective nitrogen elimination :*

- (a) Uric acid (C),
- (b) Urates—ammonia principally (C),
- (c) Uric oxide or xanthin (R).

2.—Due to defective starchy and saccharine elimination :

Oxalate of lime (mulberry calculus) (C).

3.—Due to defective sulphur elimination :

Cystin (R).

4.—*Due to non-inflammatory changes in the urine :*

- (a) Carbonate of lime (R),
- (b) Phosphate “ (R).

5.—*Due to inflammatory changes in the urine :*

Phosphates of ammonia, magnesia and lime (C).
Mixed or fusible calculus.

6. *Other Forms of concretions* (Rarer):

- (a) Fibrinous,
- (b) Urostealith,
- (c) Blood,
- (d) Siliceous,
- (e) Foreign nuclei,

7. *Compound stones—*

Size, number, facets,
Spontaneous fracture.

IV.—*Symptoms—Stone in the bladder:*

1. Pain—when absent, aggravated by motion,
2. Frequency—diminished by rest,
3. Arrest of stream,
4. Hematuria, aggravated by motion,
5. Reflex pains, along sciatic,
(even felt in tips of fingers—Cavendish).

V.—*Diagnosis—Made by :*

1. Sounding with,
 - (a) Metallic sound or lithotrite for size and double stone,
 - (b) Metal-tipped flexible catheter,
 - (c) Litholapaxy, .
Aspiration (Bigelow's).
2. Bi-manual examination, through rectum above pubes (most serviceable in children).
3. Cystoscope.
4. Digital examination (through dilated urethra, in women).
5. Digital and ocular exploration, preferably by suprapubic section (in women by Kelly's tubes, knee and elbow position).

In sounding, bladder should be moderately full.

VI.—*Errors in sounding:*

- (a) Sound is yet in elongated prostatic urethra,
- (b) Stone too light or covered with blood or mucus,
- (c) Stone hidden in a sacculus or by an interureteral bar,
- (d) Striking promontory of the sacrum,
- (e) Rubbing through stricture occasionally simulates stone,
- (f) Encrusted vesical tumor, suspicious if fixed and above line of gravity,
- (g) Stone too large to permit excursions of sound, hence simulating cancer.

VII.—*Treatment: Stone in the bladder:*

- (a) By crushing and removal of fragments:
 - Lithotritry,
 - Litholapaxy,
 } Urethral or perineal.
- (b) By cutting out the calculus:
 - Lithotomy: 1. Median,
 - 2. Lateral and modifications,
 - 3. Suprapubic.

VIII.—*Mortalities (Cabot) in 602 cases:*

	<i>Litholapaxy.</i>	<i>Perineal Lithotomy.</i>	<i>Suprapubic Lithotomy.</i>
<i>Children</i> -----	1.70%	3.01%	13. 1%
<i>Adults</i> -----	4.05%	9.07%	11.03%
<i>Old men</i> -----	7 %	19 %	18 %

IX.—*Post-operation damage from*

- 1. Lithotritry,
 - (a) Cystitis,
 - (b) Failure to evacuate all fragments.
- 2. Lithotomy (perineal),
 - (a) Sterility,
 - (b) Incontinence of urine,
 - (c) Permanent urinary fistula,
 - (d) Stricture (median operation),
 - (e) Rectal fistula.

X.—Contraindications to litholapaxy:

- (a) Calculi too large, too many or too hard,
- (b) Calculus with known foreign body or too hard or too soft to be well crushed,
- (c) Calculus encysted,
- (d) Stricture of the urethra,
- (e) False passage in urethra preventing necessary instrumentation,
- (f) Hip ankylosed in position impracticable for operation.

XI.—Diseases concurrent contraindicating lithotomy:

- (a) The shock of a cutting operation or its anæsthesia.
- (b) Disease of heart, diabetes, advanced Bright's, polyurias with low specific gravity, gout, Litholapaxy is better, or the old lithotrity.

XII.—Operations advised for stone are:

- (a) *In childhood*—Lithotomy (median or suprapubic) or Litholapaxy. For large stones suprapubic section, thus avoiding sterility.
- (b) *In adult life*—Litholapaxy. If stone resists crushing use suprapubic lithotomy.
- (c) *In old age*—Suprapubic section, in two stages (p. r. n.).

XIII.—Possible accidents in litholapaxy:

- (a) Rupture of bladder,
- (b) Nipping of bladder,
- (c) Fastening of one jaw in a pocket or sacculus,
- (d) Laceration of urethra,
- (e) Impaction of fragments in urethra,
- (f) Clogging or breaking of lithotrite.

V.—THE KIDNEYS AND URETERS.

I.—Malformations:

- (a) Single kidney 1-4,000.
- (b) Horseshoe kidney,
- (c) Floating kidney,
- (d) Movable—result of traumatism, *e. g.*, tight lacing, parturition.

II.—*Examination of the kidneys.* Bimanual best.

1. Position. If felt below ribs, it is either movable or enlarged.
2. Ballottement. If present, indicates enlarged or movable kidney.
3. Cystoscope and exploratory incision sometimes necessary.
4. Thompson's method of examination, (good).
5. Relations to colon. Determined by distending it by air.

III.—*Injuries of kidney and ureter:*

1. Contusions,
2. Lacerations,
3. Gunshot and other wounds = urinary fistula,
4. Division of ureter (*e. g.*, in gynecology. Suture of ureter),
5. Movable kidney (enteroptosis).

IV.—*Suppuration in the kidney:*

1. Synonyms — 1. Pyelitis,
2. Pyelo-nephritis,
3. Pyonephrosis.
2. Due principally to:
 - (a) Injury,
 - (b) Stone and other obstructions { 1. Urethral stricture,
2. Prostatic hypertrophy,
3. Ureteral kinking,
4. " stricture.
 - (c) Infection { 1. Common,
2. Special, *e. g.*, tuberculosis.

(Multiple abscess of kidney = interstitial suppurative nephritis).

V.—*Stone in the kidney:*

1. Results in — 1. Pyelitis,
2. Pyelonephritis,
3. Hydronephrosis,
4. Perinephritis.

2. *Symptoms*—1. Unilateral pain,
 2. Renal (kidney) colic,
 3. Hemorrhage,
 4. Changed urine { Cystoscope,
Thompson's test,
 5. Renal tenderness,
 6. Renal crepitus (?)
 7. X-ray examination,
 8. Pus (pyuria).
3. *Diagnose* in exploratory examination by
 1. Palpation of kidney and exposed ureter.
 2. Needle,
 3. Incision,
 4. Sounding of ureter.
3. *Surgical treatment of stone*:
 1. Nephrotomy,
 2. Nephrolithotomy,
 3. Nephrectomy,
 4. Ureterotomy.

VI.—*Renal abscess*:

Symptoms :

1. Enlargement of kidney—Aspiration (?)
2. Purulent urine,
3. Constitutional effects.

Treatment: Nephrotomy.

Hunt for multiple nephritic abscess. Primary or if possible secondary nephrectomy.

VII.—*Hydronephrosis*:

Due to obstruction, always mechanical and usually without septic inflammation.

- Caused by*: 1. Kinking of ureter from movable kidney,
2. Stone or stricture in ureter,
 3. Pressure on ureter, *e. g.*, tumor in bladder or pelvis,
 4. Congenital or acquired stenoses or valves.

Symptoms:

1. Unilateral, painless tumor,
2. Contents under aspiration either urinary or free from urinary salts,
3. Don't seriously effect health.

Treatment:

1. If small, and obstruction is accessible, *ureteral anastomosis*.
2. If large, remaining kidney substance is useless, hence *nephrectomy*.

VIII.—*Tumors of kidney:*

- A. Congenital — 1. Sarcoma,
 2. Cystic disease,
 3. Hydronephrosis,
 4. Cavernous tumors—rare.
- B. Extra renal — 1. Abscess—secondary,
 2. Cysts,
 3. Myxolipoma—rare,
 4. Adrenal tumors.
- C. Renal pelvis — 1. Hydronephrosis,
 2. Villous growths,
 3. Carcinoma.
- D.—Glandular or from renal substance. { 1. Hydatid cyst,
 2. Tuberculosis,
 3. Lymphadenoma—rare,
 4. Syphilis—rare,
 5. Lipoma—rare,
 6. Sarcoma,
 7. Adenoma,
 8. Carcinoma,
 9. Secondary growths.

Special symptoms:

1. Capricious hemorrhage,
2. Rapid growth of tumor,
3. Unusual general deterioration,
4. No temperature elevation.

Treatment:

Nephrectomy, except for multiple cystoma.

IX.—*Symptoms generally common to :*

1. *Calculus*, 2, *chronic suppurative inflammation*, and
3, *tumors*, are
 - (a) Hemorrhage,
 - (b) Purulent urine,
 - (c) Renal enlargement in 2) or 3).

Conjoin to this history of

- (a) Renal colic = *calculus*.
- (b) Chills and fever = *pus*.
- (c) Presence of tubercle bacilli = *tubercular*.

Without these = *cyst* or *neoplasm*.

X.—*Operations on the kidney :*

1. *Nephrorrhaphy* = stitching to abdominal wall.
For movable kidney ; 30 per cent. mortality ;
20 per cent. failures.
2. *Nephrotomy* = incision and suture. For injury,
calculus, hydronephrosis (?), cysts, abscess,
exploratory incision.
3. *Nephrectomy* = removal of kidney. For tumors,
persistent renal disorganization, renal or
ureteral fistulæ, abscess, calculi (?), large
hydronephrosis.

Mortalities:—38 per cent. Newman, in 324
nephrectomies.

28 per cent. Weir; in 25 cases, 10 per cent. mor-
tality; in last 6 cases, *no* deaths.

4. *Ureteral anastomosis :*

For wounds, strictures or valves, kinkings
and in hydronephrosis with moderate dilata-
tion.

Methods of nephrectomy :

By incision, 1. Lumbar,

2. Abdominal,

Direct or transperitoneal.

VI.—THE SCROTUM AND TESTES.

I.—*Surgical diseases of the scrotum :*

1. Sebaceous cyst,
2. Erysipelas,

3. Gangrene (urinary infiltration),
4. Elephantiasis,
5. Tumors, (a) Cysts, { Simple.
Dermoid.
 (b) Lipomata, or fatty tumors.
 (c) Epithelioma, { from soot,
" paraffin,
" coal-tar prod-
ucts.

II.—*Injuries of testes and cord :*

1. Hematocele,
2. Rupture (?) of vas deferens,
3. Spasm of cremaster muscle.

III.—*Anomalies of the testes :*

1. Absence of testes,
2. Supernumerary testes,
3. Hypertrophy of testes,
4. Atrophy of testes (from injury or metastatic inflammation, *e. g.*, mumps),
5. Maldevelopment of testes,
 One absent = monorchid,
 Both absent = cryptorchid.

Varieties : In abdomen, {
 In canal, { With or without
 At external ring, { hernia.
 In perineum, }

IV.—*Diseases of testes and cord :*

1. Epididymitis, { Simple,
2. Epididymo-orchitis, { Gonorrhœal,
Tubercular.
3. Orchitis (hernia of testis),
4. Hydrocele,
5. Spermatocoele,
6. Varicocele,
7. Neuralgia of testis (irritable testis),
8. Rotation and strangulation of testis.
9. Tumors,
 (a) Cystic,
 (b) Dermoid,

- (c) Enchondroma,
- (d) Lipoma,
- (e) Fibroma,
- (f) Sarcoma,
- (g) Carcinoma.

V.—*Hydrocele* :

- (a) Of the cord,
- (b) With congenital hernia,
- (c) Encysted,
- (d) Of the scrotum.

Treatment :

- By 1. Acupuncture,
 2. Tapping,
 3. Injection (tinct. iodine or carbolic acid),
 4. Incision (Volkman's method),
 5. Excision of tunica vaginalis (Bramann's method),
 6. Ligation of funicular portion of peritoneum in congenital hydrocele.

VI.—*Spermatocele*:

From fetal relics:

- 1. Organ of Giraldes,
 - 2. Hydatids of Morgagni,
 - 3. Vasa aberrantia,
 - 4. Epididymal cysts.
- 1, 3, 4 derived from Wolffian body and 2 from Müller's duct.

Treatment:

- 1. Injection (half full syringe, tincture of iodine),
- 2. Extirpation (when large).

VII.—*Varicocele*:

Treatment:

- 1. Palliative, by (1) Suspensory bandage,
 (2) Truss,
- 2. Operative, (1) Ligation of veins,
 (2) Excision (leave veins of vas),
 (3) Ablation of scrotum, with excision.

VIII.—*Impotence and sterility in the male:**A.—Impotence:*

1. *Organic* = malformations or injuries of the penis and testes.
 - (a) Radical amputation,
 - (b) Castration (double),
 - (c) Malformations or atrophy of testes,
 - (d) Double hernia,
 - (e) " hydrocele,
 - (f) Old cryptorchids.
2. *Symptomatic* = due to drugs, etc.
 - (a) Tobacco,
 - (b) Bromides,
 - (c) Iodides,
 - (d) Camphor,
 - (e) Conium,
 - (f) Opium,
 - (g) Alcohol, etc.
3. *Atonic* = impaired genital spinal center, or impaired cerebral nerve cells.

Due to (a) Age,

 - (b) Sexual excess,
 - (c) Prostatorrhœa,
 - (d) Masturbation,
 - (e) Stricture.
4. *False or psychological impotence:*

Due to (a) Doubt,

 - (b) Emotions,
 - (c) Irregular conditions.

B.—Sterility:

1. *Azoospermia* = absence of spermatozooids.
 - (a) Stricture of urethra,
 - (b) Phimosis.
2. *Dyspermia* = abnormal condition of semen.
3. *Aspermia* = absence of semen.
 - (a) Obstruction of ejaculatory duct,
 - (b) Failure of seminal vesicles to contract,
 - (c) Anæsthesia of glans penis.
4. Mal-emission,
5. Hypochondriasis.

IX.—*Spermatorrhea*—involuntary discharge of semen.

1. *Azoospermia* = emission but no spermatozoids.

(a) Spermatozoids inactive or dead,

(b) “ not formed, in old cryptorchids,

(c) “ formed, but not ejaculated from vas owing to epididymitis, traumatism or double hydrocele,

(d) “ not formed in diseased testes,

(e) Advanced spermatorrhea or vesiculitis.

2. *Mal-emission* :

(a) Hypospadias or epispadias,

(b) Radical amputation of penis.

SECTION III.—THE HEAD.

I.—THE SCALP.

1. *Diseases, etc.*:

(a) Sebaceous tumors,

(b) Fatty tumors,

(c) Warts, wens and horns,

(d) Wounds (erysipelas and necrosis).

2. *Contusions of the head* :

1. Affecting scalp and cranium,

(a) Hematoma,

(b) Osteomyelitis (Pott's puffy tumor).

2. Complicated with cerebral injury.

II.—CONCUSSION AND COMPRESSION OF THE BRAIN.

1. *Concussion of the brain* :

(a) Contusion of the brain,

(b) Laceration of the brain,

(c) Cerebral hemorrhage,

(d) Lesions local or remote—"Contre coup."

2. *Compression of the brain :*

- (a) Immediate, *e.g.*, { Depressed bone,
Foreign bodies.
- (b) Early and progressing=Extravasated blood.
- (c) Late=Pus.
- (d) Tumors.

SYMPTOMS:

<i>Concussion,</i>	<i>Compression,</i>
<i>Stupor</i> , partial and diminishing	Complete and increasing,
<i>Pulse</i> , feeble, often rapid	Full and slow,
<i>Breathing</i> , natural or sighing	Stertorous,
<i>Surface</i> , cold	Warm,
<i>Muscles</i> , relaxed	Natural,
<i>Restlessness</i>	<i>Paralysis</i> ,
<i>Vomiting</i>	<i>Convulsions</i> .

Treatment of Concussion: Rest, cold to head, warmth to extremities, Bromides, etc.

Treatment of Compression : TREPHINING.

Compression from fracture, immediate (always explore).

- “ “ foreign bodies, immediate.
- “ “ blood, early and progressive.
- “ “ pus, localized or diffused, late.
- “ “ tumors (pathogenic) slowly progressing.
- “ “ otitic abscess, usually slow, occasionally rapid.

Traumatic coma differentiated from :

I. *Alcoholic stupor* by

- (a) Temporary dilatation of pupils on being aroused (reliable, Macewen),
- (b) Alcohol in urine,
- (c) Effects on pressure over supra-orbital nerve (alcoholic will respond),

- (*d*) Pulse not retarded,
- (*e*) (General appearance, dress, odor of breath?)
- 2. *Opium stupor* by
 - (*a*) Slow respiration,
 - (*b*) Persistently contracted pupil.
- 3. *Uræmic stupor* by
 - (*a*) Albumin and casts in the urine,
 - (*b*) Ophthalmoscope,
 - Often difficult between 1 and 3.

III.—FOREIGN BODIES IN THE BRAIN.

Orbital wounds most fatal.

Gunshot wounds of the brain :

Auditory meatus, 5 cases, all dead.

Bullet left in = 54 per cent. mortality.

Sixteen subsequently had brain symptoms.

Bullet removed = 33 per cent. mortality.

Determined by

Fluhrer's probe, Bryant's method,

Electric probe,

X rays—2 pictures at different angles. Good for metals, not for bone.

Of 316 cases (Wharton) :

210 bodies *not* removed, 88 recovered.

106 bodies removed, 72 recovered.

10 per cent. of recoveries died 3 to 15 years later with brain symptoms.

IV.—FRACTURES OF THE SKULL.

A. Varieties :

1. At vault or base,
2. Direct or indirect,
3. Simple or compound,
4. Fissured or depressed,
5. Punctured and gunshot.

B. Complications :

1. Concussion of brain,
2. Laceration “
3. Compression “

4. Meningitis,
5. Encephalitis,
6. Hernia cerebri,
7. Septicemia,
8. Pyemia,
9. Sinus thrombosis.

RULES. *Remember !*

When in doubt with brain symptoms, *explore !*

In every compound fracture with depression,
trepine !

C. Mechanism of basal fractures :

1. *In direct violence* the fissure usually runs from trauma to base by the nearest route, *e. g.*,
 1. In frontal region, to anterior fossa (subconjunctival ecchymosis),
 2. In parieto-temporal region, to middle fossa,
 3. In occipital region, towards foramen magnum (mastoid ecchymosis),
2. *In indirect violence, e. g.*, from a fall or crush, note that when compressed antero-posteriorly, skull alters shape most and determines usually a transverse fracture, and *vice versa*.

D. Symptoms: Like laceration of the brain.

1. More or less unconsciousness, with or without severe paralysis,
2. Argyll-Robertson or Hutchinson's unilateral pupil,
3. Altered respiration,
4. Hemorrhage or fluid from ear, nose or pharynx.

Bleeding (if found) may be due to :

- (a) Ruptured membrana tympani,
- (b) Fracture through petrous bone (generally due to oblique or antero-posterior fracture).

Serum may arise from :

- (a) Cerebro-spinal fluid (rich in chlorides, sometimes sugar, no albumin),
- (b) Serum from clot,
- (c) Mucous membrane of the middle ear.

E. Treatment of basal fractures:

1. Mainly *expectant* and as far as possible *aseptic*; occasionally surgical, with removal.

(Usual treatment for ordinary cases, wash out with antiseptic, then H_2O_2 , then loosely pack with iodoform gauze for drainage and to give blood room to escape).

V.—CEREBRAL ABSCESS.*A. Etiology:*

1. Acute or chronic purulent ear inflammation (50 per cent.),
2. Traumatism,
3. Tubercular foci, etc.,
4. Localized meningitis,
5. Metastasis, *e. g.*, pneumonia, etc.

B. Site in 98 cases:

1. In temporal lobe 40 times,
2. " cerebellum 31 "
3. Elsewhere 27 "

Result of operations: 30 cases = 15 recoveries.

Macewen: 11 cases = 10 recoveries.

C. Symptoms:

From—1. *Suppuration:*

- (a) Diminished otorrhea,
- (b) Rigors and moderate temperature elevation.

From—2. *Pressure:*

- (a) Headache and pain,
- (b) Localized tenderness,
- (c) Nausea and vomiting,
- (d) Nerve (III, VI, VII) paralysis (aphasia, mono- and hemi-plegia; late),
- (e) Hebetude, stupor, mild delirium,
- (f) Pulse and respiration changes; late.

In 10 abscesses in temporo-sphenoidal lobe, 9 recovered (Macewen).

VI.—CEREBELLAR ABSCESS.

Symptoms—Obscure.

- (a) Occipital headache,
- (b) Rigidity of neck muscles,
- (c) Expulsive vomiting,
- (d) Vertigo, muscular incoördination if middle lobe is involved.

In 8 operations, 4 recoveries (Macewen):

VII.—LATERAL SINUS ABSCESS.

Symptoms :

- (a) Rapid pulse,
- (b) High fluctuating temperature,
- (c) Repeated chills,
- (d) Delirium,
- (e) Suppuration at mastoid foramen,
- (f) Thrombosis of jugular vein,
- (g) Pleuritic and pulmonary complications.

Operations :

1. Trephining to open sinus and abscess (Lane, 1889),
2. Also to ligate jugular vein to prevent lung infection (Ballance, 1890),
17 cases, 13 deaths (Macewen).

VIII.—RULES FOR TREPHINING.

1. *For meningeal hemorrhage* :

- (a) Two inches *above* middle of zygoma,
- (b) Intersecting line from posterior edge of mastoid and from upper edge of orbit.

2. *For mastoid suppuration* :

One-quarter inch *behind* and $\frac{1}{4}$ inch *above* auditory opening. *Note* : Keep close to auditory canal for antrum.

3. *For otitic extra-dural abscess* :

Enlarge No. 2 *upwards* and *forwards* (by forceps or trephine).

4. *For otitic cerebral abscess:*

One and one-quarter inches *behind* and $1\frac{1}{4}$ inches *above* auditory opening.

Note: Explore in the line of the opposite alar nasi.

5. *For otitic cerebellar abscess:*

One and one-half inches *behind* auditory opening and $\frac{1}{4}$ inch *below* it. *Note:* Explore *forwards, upwards and inwards*.

6. *For sinus abscess and infectious suppurative meningitis:*

One inch *behind* and $\frac{1}{4}$ inch *above* auditory opening.

7. *For tapping the ventricles:*

Same as No. 4. *Note:* Explore to the depth of 2 to $2\frac{1}{4}$ inches in a line $2\frac{1}{2}$ to 3 inches *above* opposite aural opening.

IX.—BRAIN TUMORS.

A. Varieties—(580 cases collected by Drs. Weir and Seguin).

Sarcoma or glioma.....	28 per cent.,
Tubercular (multiple or consecutive).....	23 per cent.,
Hydatid or other cystoma.....	9 per cent.,
Carcinomata and consecutive.....	4 per cent.,
Gummata.....	$3\frac{1}{2}$ per cent.,
Fibromata.....	1 per cent.

Only 10 per cent. could have been removed.

Only 5 per cent. (Dana) or 6 per cent. (Starr) could be diagnosed.

B. Symptoms:—

- (a) Headache,
- (b) Increasing stupor,
- (c) Convulsions,
- (d) Choked (optic) discs,
- (e) Slow pulse,
- (f) Aphasia,
- (g) Hemianopsia,
- (h) Apraxia,
- (i) Alexia.

C. Diagnosis should include

- (a) Existence of tumor,
- (b) Location,
- (c) Depth,
- (d) Numbers,
- (e) Nature,
- (f) Size.

D. Surgical treatment :

In 87 operations = $34\frac{1}{2}$ per cent. mortality.

Of 74 cerebral, 45 recovered.

In 57 tumor found and removed, 38 recovered, 19 died = 33 per cent. mortality.

Of 13 cerebellar, 11 died = 84 per cent. mortality.

E. Medical treatment :

If tumor be syphilitic or supposed to be so, give enormous doses of KI.

F. Localizing symptoms :

- (a) Invading paralysis, spreading from part to part, and constantly increasing, is an important sign.
- (b) Jacksonian epilepsy is very important, if connected with signal symptoms.
- (c) Slow pulse, aphasia and hemianopsia are *not* infallible.
- (d) Hemianopsia generally points to a lesion behind the chiasm.

X.—APPLICATIONS OF TREPHINING.*1. Traumatism :*

- (a) Depressed fractures of the skull,
- (b) Meningeal and intracranial hemorrhage,
- (c) Extra-dural and sub-dural abscess,
- (d) Epilepsy (?) (note dural sensitiveness),
- (e) Suppurative meningitis.

2. Disease :

- (a) Ear suppuration,
 - 1. Mastoid abscess,
 - 2. Extra-dural abscess,

3. Cerebral or cerebellar abscess,
4. Lateral sinus abscess,
5. Lepto-meningitis.
- (b) Tumors (removable and non-removable),
- (c) Jacksonian epilepsy (10 per cent. mortality),
- (d) Inveterate localized headache,
- (e) Pachymeningitis hemorrhagica,
- (f) Hydrocephalus and distension of ventricles,
- (g) Microcephalus and idiocy (?),
- (h) Insanity and general paralysis (?),
- (i) Severe and progressive apoplexy (?).

XI.—NEURALGIA OF THE FIFTH NERVE.

(Neurotomy of the trigeminal nerve).

1. *Second branch* :—

- (a) Carnochan's method,
- (b) Linhart's “
- (c) Langenbeck's “

2. *Third Branch*:

- (a) In the mouth (Paravicini),
- (b) At angle of jaw (Gross),
- (c) Above zygoma (Salzer),
- (d) In cranium (Hartley and Horsley).

A.—Carnochan's operation:

Make an opening in and at back part of antrum. Break through the wall, and cut nerve at foramen rotundum.

B.—Langenbeck's operation:

Pass a tenotomy knife above floor of orbit, following the nerve backwards, and cut at foramen rotundum. (This is a blind method and is not advisable.)

C.—Paravicini's operation:

Aims to cut inferior dental nerve at dental foramen, conducting the operation through the mouth.

Diagnosis, movement in deglutition.

*Treatment:*1. *Non-operative:*

- (a) Thyroid feeding and
- (b) Electricity.

2. *Operative:*

- (a) Repeated injection of iodoform (emulsion) or iodine,
- (b) Partial resection,
- (c) Enucleation for cysts (avoid hypodermic puncture),
- (d) Ligation of superior and inferior thyroid arteries,
- (e) Thyroidechthesis,
- (f) Removal of cervical ganglia of sympathetic.

For hyperplasia:

- Use 1. Thyroid feeding,
 2. Injections of iodoform or iodine,
 3. Partial resection, or
 4. Ligation of thyroid arteries?

For tumors:

- Use 1. Enucleation or
 2. Partial resection.

SECTION V—THE LARYNX AND TRACHEA.

1. *Sub-hyoid pharyngotomy:*

- (a) For small neoplasms in pharynx and larynx.
- (b) For fixed foreign bodies in pharynx and larynx.

2. *For sub-hyoid bursitis (?)*. Better to inject with melted paraffin and dissect out when hardened.3. *Thyrotomy, or laryngo-fissure:*

For intra-laryngeal growths and fixed foreign bodies (notch thyroid to insure exact reposition).

4. *Tracheotomy, including laryngotomy :*

(a) *For obstruction in acute inflammation,*

- as 1. Œdema of glottis,
2. Acute laryngitis, burns and scalds,
3. Croup, diphtheria.

(b) *For non-inflammatory obstruction :*

1. Foreign bodies in larynx, trachea and bronchus,
2. For malignant disease,
3. “ cicatricial stenosis,
4. “ stenosis from external pressure, tumor or abscess.

(c) *For obstruction of nerve origin :*

1. Spasms of larynx,
2. Double adductor paralysis,
 - (a) Cervical tumors,
 - (b) Thoracic aneurism.

(d) *For painful ulceration of larynx :*

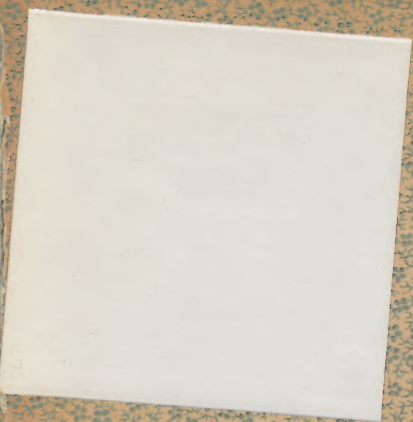
E.g., syphilis or tuberculosis ; to give relief or rest to the parts.

(e) *Preliminary to other operations in or near upper air-passages, e. g., tongue extirpation etc.*

(f) *For fracture of the larynx.*

Tracheotomy is divided into

1. Crico-thyroid laryngotomy,
 2. Supra-thyroid tracheotomy,
 3. Infra- “ “ .
5. *Laryngectomy* or extirpation of the larynx. (Avoid cardiac nerves, shut off pharynx ; artificial larynx).



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